IN THE CLAIMS:

Please amend claims 1-2, 4-6, 11, 18-23, 26-27 as follows.

Please add new claims 28-29 as follows.

1. (Currently Amended) A method ~~of estimating the location of a mobile device~~, comprising:

collecting location information;

selecting at least one of a plurality of different location methods to provide a location estimate said methods comprising using cell identity information;

determining a first location estimate based on the at least one selected location method;

determining a virtual base station estimate ~~dependent on~~using at least some of the collected location information; and

providing a second location estimate using one of said different location methods based on ~~at least one of~~ the ~~at least one selected~~ first location ~~method~~ estimate and the virtual base station ~~estimate.~~estimate, said second location estimate being a location of a mobile device.

2. (Currently Amended) A method as claimed in claim 1, wherein said at least one location method comprises at least one of:

using cell identity information;

using cell identity information and received signal strength;

using cell identity information and timing advance information; and

using cell identity information, received signal strength information and timing advance information.

3. (Cancelled)

4. (Currently Amended) A method as claimed in claim 2, further comprising determining thea virtual base station estimate, ~~wherein said virtual base station estimate is determined~~ using at least one of the ~~methods of claim 2~~ cell identity information, cell identity information and received signal strength, cell identity information and timing advance information, and using cell identity information, received signal strength information and timing advance information.

5. (Currently Amended) A method as claimed in claim 1, wherein said virtual base station location estimate is coupled with at least one virtual measurement and at least one real measurement, ~~and~~ said at least one virtual measurement ~~is~~being processed using a location method.

6. (Currently Amended) A method as claimed in claim 2, wherein providing said second location estimate comprises processing said virtual base station location estimate is coupled with at least one virtual measurement and at least one real measurement, ~~and~~ said at least one virtual measurement ~~is~~being processed using a location method, and

wherein the at least one real and the at least one virtual measurements are processed using ~~a location method as defined in claim 2~~ at least one of cell identity information, cell identity information and received signal strength, cell identity information and timing advance information, and using cell identity information, received signal strength information and timing advance information.

7. (Previously Presented) A method as claimed in claim 5, wherein a value for the virtual measurement is one of measured levels, a combination of measured levels, and an average of measured levels.

8. (Previously Presented) A method as claimed in claim 1, wherein said at least one location method is selected in dependence on the location information available.

9. (Previously Presented) A method as claimed in claim 1, wherein a plurality of location estimates are determined and at least one estimate is used to provide said location estimate.

10. (Previously Presented) A method as claimed in claim 1, wherein said location information is collected by said mobile device.

11. (Currently Amended) A method as claimed in claim 10, wherein said mobile device is ~~arranged~~ configured to measure a level of at least one type of information.

12. (Previously Presented) A method as claimed in claim 1, wherein said location information comprises at least one of timing advance information and received signal level.

13. (Original) A method as claimed in claim 12, wherein said received signal level is an absolute received signal level or relative received signal level.

14. (Previously Presented) A method as claimed in claim 1, wherein said mobile device is in a cellular communications device.

15. (Original) A method as claimed in claim 14, wherein said information is collected for a serving cell of the mobile device.

16. (Previously Presented) A method as claimed in claim 14, wherein said information is collected for at least one neighbouring cell.

17. (Previously Presented) A method as claimed in claim 14, further comprising selecting the or each cell in respect of which location information is collected.

18. (Currently Amended) A method ~~of estimating the location of a mobile device, the method,~~ comprising:

collecting location information;

selecting at least one of a plurality of different location methods to provide a location estimate said methods comprising using cell identity information;

providing a location estimate of the mobile device based on the at least one selected location methods,

wherein the location estimate is provided using the following algorithm

calculate the total attenuation experienced by a signal transmitted by the i-th BTS while propagating toward a mobile station where i-th level observation is L^i) by subtracting from the i-th measured received power, P^i_r, the maximum power radiated by the i-th BTS, $P^i_{t,max}$:

$$L^i = P^i_r - P^i_{t,max} \quad ; \quad i = 1,\ldots,N$$

stack the level observations from N BTS's in vector **L**:

$$\mathbf{L} = \left[L^1,\ldots,L^N\right]^T$$

solve the minimization problem:

$$\begin{bmatrix} \hat{\sigma_u}^2 \\ \hat{x} \\ \hat{y} \end{bmatrix} = \arg \min_{\begin{bmatrix} \sigma_u^2 \\ x \\ y \end{bmatrix}} F\left(x,y;\sigma_u^2\right)$$

where the *cost function* $F(x,y;\ \sigma_u^2)$ is defined as follows:

$$F\left(x,y;\sigma_u^2\right) = \ln \sigma_u^2 + \ln |\mathbf{r_L}(x,y)| + \frac{1}{\sigma_u^2} [\mathbf{L} - \mathbf{m_L}(x,y)]^T \mathbf{r_L}^{-1}(x,y) [\mathbf{L} - \mathbf{m_L}(x,y)]$$

and

$$\mathbf{m}_{\mathrm{L}}(x,y) = \left[\mu_L^1(x,y),\ldots,\mu_L^N(x,y)\right]^T$$

$$\mu_L^i(x,y) = -\mathrm{PL}^i\left(d^i(x,y)\right) - AP_{tr}^i\left(\psi^i(x,y)\right)$$

$$[\mathbf{r}_{\mathrm{L}}(x,y)]_{ij} = \begin{cases} 1 & i=j \\ \rho_u^{i,j}(x,y) & i\neq j \end{cases} \qquad i,j = 1,\ldots,N$$

determining the location of ~~a~~the mobile device dependent on the location estimate.

19. (Currently Amended) A method ~~of estimating the location of a mobile device~~, comprising:

collecting location information;

selecting at least one of a plurality of different location methods to provide a location estimate said methods comprising using cell identity information; and

providing a location estimate based on the at least one selected location method, wherein a location estimate is provided using the following algorithm

calculate the total attenuation experienced by a signal transmitted by the i-th BTS while propagating toward a mobile station where the i-th level observation is L^i by subtracting from the i-th measured received power, P^i_r, the maximum power radiated by the i-th BTS, $P^i_{t,max}$:

$$L^i = P_r^i - P_{t,max}^i \quad ; \quad i = 1,\ldots,N$$

stack level observations from *N* BTS's in vector **L**:

$$\mathbf{L} = \left[L^1,\ldots,L^N\right]^T$$

solve the minimization problem:

$$\begin{bmatrix} \hat{x} \\ \hat{y} \end{bmatrix} = \arg \min_{\begin{bmatrix} x \\ y \end{bmatrix} \in \mathcal{D}_{xy}} F(x,y)$$

where the *cost function F(x,y)* is defined as follows:

$$F(x,y) = \sum_{i=1}^{N} \left(L^i + \mathrm{PL}^i(x,y) + AP^i_{tr}(x,y) \right)^2$$

and D_{xy} is the domain of existence of x and y.

calculate $\hat{\sigma}_u^2$ as

$$\hat{\sigma_u}^2 = F(\hat{x},\hat{y})$$

,

determining the location of ~~a~~the mobile device dependent on the location estimate.

20. (Currently Amended) A method ~~of estimating the location of a mobile device~~, comprising:

collecting location information;

selecting at least one of a plurality of different location methods to provide a location estimate said methods comprising using cell identity information; and

providing a location estimate based on the at least one selected location method,

wherein a location estimate is provided using the following algorithm:

calculate the total attenuation experienced by a signal transmitted by the i-th BTS while propagating toward a mobile station where the i-th *level observation* is L^i) by subtracting from the i-th *measured* received power, Pt, the maximum power radiated by the i-th BTS, $P^i_{t,max}$:

$$L^i = P_r^i - P_{t,max}^i \quad ; \quad i = 1,\ldots,N$$

calculate the j-th *level difference observation* by subtracting the j-th level observation from the level observation L^1 taken as reference:

$$D^j = L^1 - L^j \quad ; \quad j = 2,\ldots,N$$

stack the *N - 1* difference of level observations in a vector **D**:

$$\mathbf{D} = \left[D^2,\ldots,D^N\right]^T$$

solve the minimization problem

$$\begin{bmatrix} \hat{x} \\ \hat{y} \end{bmatrix} = \arg \min_{\begin{bmatrix} x \\ y \end{bmatrix} \in \mathcal{D}_{xy}} F(x,y)$$

where

$$F(x,y) = \sum_{j=2}^{N} \left(D^j - \mu_D^j(x,y)\right)^2 - \frac{1}{N}\left(\sum_{j=2}^{N} D^j - \mu_D^j(x,y)\right)^2$$

and

$$\mu_D^j(x,y) = -\left[\mathrm{PL}^1\left(d^1(x,y)\right) - \mathrm{PL}^j\left(d^j(x,y)\right)\right] - \left[AP_{tr}^1\left(\psi^1(x,y)\right) - AP_{tr}^j\left(\psi^j(x,y)\right)\right]$$

D_{xy} is the domain of existence of x and y,

determining the location of the mobile device dependent on the location estimate.

21. (Currently Amended) A method ~~of estimating the location of a mobile device~~, comprising:

collecting location information;

selecting at least one of a plurality of different location methods to provide a location estimate said methods comprising using cell identity information; and

providing a location estimate based on the at least one selected location method,

wherein a location estimate is provided using an algorithm solving the following equation in x and y:

$$\begin{cases} \sum_{i=1}^{N} F^i(x,y)\left(x - x^i\right) = 0 \\ \\ \sum_{i=1}^{N} F^i(x,y)\left(y - y^i\right) = 0 \end{cases} \quad ; \quad (x,y) \in \mathcal{D}$$

where

$$F^i(x,y) = \frac{2B^i/C^i(d_0)}{(2\pi)^{3/2}\,\sigma_u^i \ln 10} \frac{\exp\left\{-\frac{1}{2\sigma_u^{i\,2}}\left(B^i \log_{10} d^i(x,y) - z^i + A^i\right)^2\right\}}{[d^i(x,y)]^4} \cdot \left[\frac{B^i\left(B^i \log_{10} d^i(x,y) - z^i + A^i\right)}{2\sigma_u^{i\,2} \ln 10} - 1\right]$$

determining the location of a~~the~~ mobile device dependent on the location estimate.

22. (Currently Amended) A method ~~of estimating the location of a mobile device~~, comprising:

collecting location information;

selecting at least one of a plurality of different location methods to provide a location estimate said methods comprising using cell identity information; and

providing a location estimate based on the at least one selected location method,

wherein a location estimate is provided using an algorithm solving the following equation in x and y:

$$\begin{cases} \sum_{i=1}^{N}\left[-\frac{\mathcal{I}_i}{|\mathbf{R}|}(x-x^i)-\frac{(\tilde{\mathcal{I}}_i-1)}{|\mathbf{R}|}\left\{(x^i)^2x-x^iy^i(y-y^i)\right\}\right]=0 \\ \sum_{i=1}^{N}\left[-\frac{\mathcal{I}_i}{|\mathbf{R}|}(y-y^i)-\frac{(\tilde{\mathcal{I}}_i-1)}{|\mathbf{R}|}\left\{(y^i)^2y-x^iy^i(x-x^i)\right\}\right]=0 \end{cases} \quad ; \quad (x,y)\in\mathcal{D}$$

determining the location of ~~a~~the mobile device dependent on the location estimate.

23. (Currently Amended) A method ~~of estimating the location of a mobile device~~, comprising:

collecting location information;

selecting at least one of a plurality of different location methods to provide a location estimate said methods comprising using cell identity information; and

providing a location estimate based on the at least one selected location method,

wherein a location estimate is provided using an algorithm based on the following equation in x and y:

$$\hat{x}=\frac{\sum_{i=1}^{N}\frac{x^i}{\mathcal{I}_{i0}}}{\sum_{i=1}^{N}\frac{1}{\mathcal{I}_{i0}}} \quad ; \quad \hat{y}=\frac{\sum_{i=1}^{N}\frac{y^i}{\mathcal{I}_{i0}}}{\sum_{i=1}^{N}\frac{1}{\mathcal{I}_{i0}}} \quad ; \quad (\hat{x},\hat{y})\in\mathcal{D}$$

determining the location of ~~a~~the mobile device dependent on the location estimate.

24. (Previously Presented) A method as claimed in claim 1, wherein said location estimate is provided by one of a iterative and a closed form method.

25. (Previously Presented) A method as claimed in claim 1, wherein said location estimate is provided by one of a linear and non linear method.

26. (Currently Amended) A system ~~for estimating the location of a mobile device~~, comprising:

collecting means for collecting location information;

selecting means for selecting at least one of a plurality of different location methods to provide a location estimate said methods using cell identity information;

location determining means for determining a first location estimate based on the at least one selected location method; and

estimate determining means for determining a virtual base station estimate, using one of said different location methods; and

providing means for providing a second location estimate based on at least one of ~~the at least one selected~~ the first location ~~method~~ estimate and the virtual base station estimate, said second location estimate being an estimate of the location of a mobile device.

27. (Currently Amended) A system ~~for estimating the location of a mobile device~~, comprising:

~~collecting unit~~a collector configured to collect location information;

~~selecting unit~~a selector configured to select at least one of a plurality of different location methods to provide a location estimate, said methods using cell identity information;

~~determining unit~~a determiner configured to determine a first location estimate based on the at least one selected location method and further configured to determine a virtual base station estimate; and

~~providing unit~~a provider configured to provide a second location estimate, using one of said different location methods based on ~~at least one of~~ the first ~~at least one selected~~ location ~~method~~ estimate and the virtual base station estimate, said second location estimate being an estimate of the location of a mobile device.

28. (New) Apparatus, comprising:

a collector configured to collect location information;

a selector configured to select at least one of a plurality of different location methods to provide a location estimate, said methods using cell identity information;

a determiner configured to determine a first location estimate based on the at least one selected location method and further configured to determine a virtual base station estimate; and

a provider configured to provide a second location estimate, using one of said different location methods based on the first estimate and the virtual base station estimate, said second location estimate being an estimate of the location of the apparatus.

29. (New) A computer program embodied on a computer readable medium, said computer program configured to control a processor to perform:

collecting location information;

selecting at least one of a plurality of different location methods to provide a location estimate said location methods comprising using cell identity information;

determining a first location estimate based on the at least one selected location method;

determining a virtual base station estimate using at least some of the collected location information; and

providing a second location estimate using one of said different location methods based on the first location estimate and the virtual base station estimate, said second location estimate being a location of a mobile device.